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By A. T. DRUMMOND.

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Some Notes on the Rideau Canal, the Sources of its Water Supply, and its Early History.

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A somewhat careful investigation into the nature of the country bordering on the Rideau Canal, as well as of the lakes on its course and of its water powers—all in connection with a line of railway now being surveyed—has led to my ascertaining some facts of interest which I desire to here mention. It has further occurred to me that here also might be a fitting place for a short resumé of the facts—almost unknown now in this country—connected with the inception and construction of the canal. These facts I have abbreviated from the extensive manuscript notes—taken from the Dominion archives and other sources, as well as from personal recollection—of Mr. Andrew Drummond of Ottawa, whose association and close family connection with two of the leading builders of the canal and personal acquaintance, formed in 1832, with others who planned its construction, enables him to speak with not only some interest, but even some authority.

The canal may be divided into the river and the lake divisions, the former comprising the Rideau River which was the original outlet to the Ottawa of the Upper and Lower Rideau Lakes lying beyond Smith's Falls. The lake division, besides these two lakes, includes Mud, Clear, Indian, Opinicon, Sand, Whitefish and Cranberry Lakes, to which may be added the long artificial lake, known as the "drowned lands," created between Washburn and Kingston Mills, by the erection of the Kingston Mill's dam. The waters of Upper Rideau Lake form the summit level of the canal system, and are admitted by the locks on either side of the lake to the Ottawa River slope or to the St. Lawrence River slope as the traffic on the canal requires. The immense importance of keeping a sufficient supply of water in this lake is so obvious that every means should be taken to husband the waters of its feeders, Clear, Wolfe and Sand Lakes, which empty into it at Westport. The forest country around these outer lakes should be kept, as far as pos-

sible, in its virgin state by protecting it from forest fires and absolutely withdrawing it from settlement, in order to hold back within these forests the accumulations from the melted snow and the rain which otherwise will be too quickly drained off into the lakes. Were Upper Rideau Lake allowed in midsummer to fall seriously in level at the locks, the whole canal would be rendered practically useless.

The depth of water in the different lakes, according to old navigators and fishermen, is not very great. The lakes on the St. Lawrence slope do not, it is said by them, exceed 100 feet in depth. My own soundings in the upper half of of Lower Rideau Lake at points where our fisherman indicated were the greatest depths, gave 114 feet as the maximum, but in the Rocky Narrows nearer Oliver's Ferry on the same lake, the lead has, it is asserted, found the bottom at about 200 feet.

The waters of these in land lakes are in similar depths considerably colder than those of Lake Ontario. On the 6th July, 1893, at noon, under the conditions of strong sun, with a few light clouds and a comparative calm, the thermometer readings, at one half a mile from Grindstone Island, in Lower Rideau Lake, gave the following temperatures of the water :

1 inch below surface.....	77° F.
2½ feet " "	74° F.
102 " " "	47.5° F.

Half an hour later, at another locality, a quarter of a mile farther from the island, and with more clouds in the sky, the record indicated :

1 inch below surface.....	76° F.
2 feet " "	74.5° F.
96 " " "	45° F.

In the Ontario waters, at this period, with their temperature raised by constant accessions from Lake Erie, which not only lies further south but is also very shallow, the mercury in the main channel opposite Kingston stood at 62.25° in 11 fathoms in one locality, and at 53° in 17 fathoms in another.

In Cataraqui Bay, where the waters of the canal join Lake Ontario, there is what old navigators call "a tide" of

ten inches to one foot, caused evidently by the frequent westerly winds on Lake Ontario forcing the water to a higher level in the gradually contracted area forming the bay. Capt. Fleming, of the steamer *James Swift*, informs me that it comes and goes, and is so well known that when his boat happens to ground, through missing the channel, he simply waits for the "tide" to again float it. During a continuous calm of two or more days the rise and fall cease.

It is an interesting fact that the summit levels of the different systems of lakes which are the sources of the water supply of the Rideau Canal lie chiefly in the townships of Bedford and Loughborough, and within a very moderate distance of Lake Ontario. The headwaters of the Loughborough Lake system are within seven miles of Kingston; Knowlton, the uppermost of those lakes which find an outlet on the canal at Mud Lake, is within thirteen miles of the same place; whilst Bobb's Lake (a corruption, perhaps, of Robb's Lake), the most important of the higher levels of the River Tay system, whose waters eventually reach the Ottawa, is also situated within twenty-five miles of Kingston. The low, broad ridge of gneiss which connects the Laurentian rocks of New York State with the main range in Canada, forms the watershed here of the streams falling into the Ottawa, on the one hand, and the St. Lawrence and Lake Ontario, on the other. The strata are, however, thrown up into very numerous subordinate ridges, which lie here in directions generally north-east and south-west, and somewhat parallel to each other. These ridges, prolonged far to the south-west towards Kingston, have led to the formation and extension of lake basins in that direction. Those who planned the Rideau Canal, notably Col. By, showed their engineering skill in taking advantage of the number and different levels of these lake basins to procure an adequate supply of water for navigation on the summit level as well as on both slopes, causing the waters sometimes, as in the Loughborough Lake and the Devil's Lake systems, to almost double on themselves.

This great water system, including in it fifty-three lakes which are from one to fifteen miles long, has another peculiarity, that these lakes lie, with only four unimportant

exceptions, on the west and north-west side of the canal. Between Kingston Mills and the mouth of the Tay the canal lies, as it were, on the side of a gentle slope from the south-west, the lakes thus on that side discharging into it, whilst those on the other find their outlet chiefly through the Gananoque River to the St. Lawrence.

We are apt to regard the townships of Storrington, Loughborough and Bedford and the east half of the township of Hinchinbrooke, all in the county of Frontenac, as unattractive for settlement, and to assume that when the pine and spruce are removed from their forests there will be nothing left in this somewhat rugged country but the possibility of minerals. It is consoling, however, to think that all the lakes which, walled in by heights of verdure-clad gneiss, picturesquely stud these townships in every direction, are the great reservoirs from which chiefly is drawn the supply of water needed to keep the Rideau Canal navigable as well in its course to Ottawa as in its course to Kingston. Had the great forces of nature not placed these Laurentian ridges in positions to form lake basins between them, and left the country rugged and unattractive, so that the virgin forests might largely remain and in their depths hold back the waters from being too quickly drained away, it would be hopeless to maintain uninterrupted navigation on the canal.

The more that consideration is given to the subject, the more reasonable does it seem to be to regard these Laurentian ridges as having long preceded the ice age, and to view the lakes, scattered over this archæan area here in such apparent, picturesque confusion, as in reality occupying still older lake basins whose position and general direction was due to the presence of the ridges, and through which guided in their course by the lie of the ridges, the glaciers during the ice age flowed. These ancient ridges have suffered from the decomposing forces of perhaps centuries of the growth and decay upon their surfaces of plant life, of the extremes of heat in summer and cold in winter, and of

the wearing effect of storms and floods, and possibly may have felt the force of even former ice periods, and their worn shapes must not be altogether attributed to post-pliocene times.

On its western and northwestern sides the canal is fed by seven systems of lakes. Two of these, the River Tay and Black Lake systems, supply Lower Rideau Lake, and eventually through the Rideau River, reach the River Ottawa. One system, the Wolfe Lake system, joins Upper Rideau Lake, the summit lake, and is therefore tributary to both the St. Lawrence and the Ottawa slope. The other four systems furnish the supply of water for the St. Lawrence slope, and also are through the outlet, in reality now a great waste weir, at Morton, the actual headwaters of the Gananoque River. On the easterly side of the canal, three or four small lakes form sources of supply, but of these only Irish, Otter and Bass Lakes have any importance.

The comparative freedom from water courses is a singular feature of the country bordering on the Rideau River after it leaves the lake systems. With the exception of the River Goodwood (or Jock), Irish Creek and the south branch of the Rideau River, not one of which has pretensions to being more than a creek, the Rideau has practically no tributaries in this length of about 70 miles.

Considerable confusion appears to exist on the maps as to the locality, name and outlet of many of the lakes in Frontenac county, and it is therefore desirable to briefly refer to the lakes forming each system, my authority being one of the original charts on file in the Department of Railways and Canals at Ottawa, which Mr. F. A. Wise, the superintending engineer has kindly allowed me to consult.

River Tay System.—Long, Eagle and Elbow Lakes in the townships of Hinchinbrooke and Olden, are at the headwaters of this system. In Bedford, it is joined by Bobs, (probably, originally, Robb's), Crown or Crow) and Green Lakes. Entering South Sherbrooke as the River Tay, it has, added to it, the waters of Farrens and Silver Lakes, and

then widens into Christie's Lake. Grant's Creek connects it near Perth with Pike, Second and Third Lakes and near its outlet into Lower Rideau Lake, it receives the waters of Otty Lake.

Black Lake System.—Black Lake in North Burgess and a small lake beyond it in North Crosby, constitute an independent system which is also tributary to Lower Rideau Lake.

Wolfe Lake System.—Clear Lake (No. 2) in Bedford forms the summit, but Wolfe Lake and Sand Lake, the latter wholly in North Crosby, are the principal reservoirs and supply Upper Rideau Lake at Westport.

Devil's Lake System.—Knowlton, Mud, Otter and Desert Lakes in the township of Loughborough are at the headwaters of this system. Desert Lake is joined from Bedford by the waters of Carter (or Garter), Canoe and Elbow (No. 2) Lakes and the system then expands into Birch Lake which also receives the outflow from Long Salmon Lake in the township of Loughborough. Mud (No. 2) and Devil Lakes in Bedford are further expansions of the system, which, after including Loon Lake in North Crosby, eventually reaches the Canal system at Mud Lake proper.

Buck Lake System.—Draper is the largest of a small group of lakes in the township of Loughborough at the source of this system. These along with Clear Lake (No. 3) and four smaller sheets of water are tributary to Buck Lake, which lies partly in Bedford, and whence the waters flow by the Mississagua River to Mosquito Lake in South Crosby, from which they reach Mud and Indian Lake on the Canal route.

Rock Lake System.—This system takes its rise in the township of Loughborough but its larger sheets of water, Expedition, Upper Rock and Rock Lakes, are in Storrington. It is tributary to the Canal system at Opinicon Lake.

Loughborough Lake System.—This system is tributary to the Canal near Brewer's Mills, and includes Troy, Little Cranberry and Dog Lakes, all in Storrington, and Loughborough Lake which is situated partly in the township of Loughbor-

ough and partly in Storrington, and is the largest of the Rideau Canal feeders.

As, originally, Cranberry Lake—then known as Cranberry Marsh—appears to have had a connection with Whitefish Lake, the waters of this system may, in times of flood, have been also tributary to the Gananoque River and have reached the St. Lawrence at Gananoque as well as Lake Ontario at Kingston.

The duplication of names should be avoided by the Government renaming some of these lakes, the scanty population and small interests presently involved, readily admitting of this being done. Other defects in nomenclature also need pressing attention.

EARLY HISTORY OF THE CANAL.

At the close of the war between France and Great Britain which resulted in French Canada becoming a British Crown Colony, the Ottawa valley had a few settlements as far up the river as Carillon on the north side, but the south side was still an almost unbroken wilderness. In 1783, the British Government, in pursuance of its policy of settling the United Empire Loyalists from the United States, and the disbanded soldiers, upon free grant lands in Canada, sent Lieutenants French and Jones to explore the country, on either side of the River Ottawa. Lieutenant French proceeded up the river as far as the Rideau Falls and then diverging inland, followed the Rideau River to the Rideau Lakes. Coursing his way through the net-work of lakes met with beyond this, he at length reached the Gananoque River, down which he went to the St. Lawrence. Lieutenant Jones pushed through the country bordering the River Ottawa, along its northern banks, until he reached the Chaudiere Falls, where he crossed to the other side and returned to Montreal by the south bank. Both officers found a large amount of land available for settlement. No special official action appears, however, to have been taken, at the time, on these reports, and the course of settlement for

years afterwards continued rather to be directed to the valley of the St. Lawrence.

The construction of a canal to connect the River Ottawa with Lake Ontario formed the subject of discussion from time to time after this, but it was not until the breaking out of the war between the United States and Great Britain, in June, 1812, that the urgent necessity for such a canal became apparent both to the British Government and to the Canadian leaders. The transportation of arms and supplies from Quebec and Montreal to the upper lakes by way of the St. Lawrence River involved great exposure to the enemy along the extended frontier of New York State. The expense arising from the Government's endeavor to avoid this exposure was enormous. The transportation of a 24-pounder cannon from Quebec to Kingston alone cost nearly one thousand dollars. The earliest official document dealing practically with the subject of a canal appeared on the 29th December, 1814, in the shape of a letter from Sir George Prevost, in command in Upper Canada, to Lieut.-Gen. Sir Gordon Drummond, at Kingston, enclosing some plans and reports, and asking for opinions thereon and for further information. Sir Gordon's reply, transmitting reports from three of the local officers, gave his own opinion that the difficulties would be immense and the expense enormous.

On the restoration of peace, however, Sir Gordon Drummond was instructed by Lord Bathurst, under date of 10th October, 1815, to get "estimates of the expense of the Lachine Canal, and of the Ottawa and Rideau being made navigable, in order that His Majesty's Government may decide as to the propriety of undertaking these works, either separately or simultaneously." Accordingly Lieut. Jebb was, early in 1816, directed to ascend the Cataraqui River to the chain of lakes and thence continue down the Rideau River to the Ottawa, and to return by the same route, reporting on the land available for military settlements and on the navigation for batteaux. His report

recommended certain dams to be constructed and certain channels on the Rideau River to be cleared of obstructions. It was immediately subsequent to this that the military settlements of Perth and Richmond were laid out, but not until 1819 that construction of canals was actively undertaken, by the Imperial Government. In this year the Grenville Canal was begun by the Royal Staff Corps, although not completed until 1833. In 1821 the Carillon Canal was similarly commenced by the Staff Corps and completed in 1834; whilst the Lachine Canal was undertaken by the Lower Province, with some aid from the Imperial Government, and finished in 1824.

In 1821 the interest of the people of the Upper Province was thoroughly aroused, and a commission, under the presidency of Hon. John Macaulay of Kingston, was appointed to consider the improvement of the internal navigation of the Province. The commission reported on the Rideau Canal on the 5th October, 1825, giving three estimates of cost; that for a canal 5 feet deep, and with locks 80 feet long by 15 wide, being £145,802 stg. This report was apparently at once transmitted to the British Government, which in the same year sent out a commission, composed of Sir J. C. Smyth, Sir G. Hoste and Major Harris, C.E., to enquire into the cost of construction of a canal on the same scale as the Lachine Canal, which had been made 5 feet deep, and with locks 108 feet long by 20 feet wide. This commission in its report estimated the cost at £169,000 stg., and on this report being received by the Home Government the construction of the Rideau Canal was determined on.

On 30th May, 1826, Lieut.-Col. By, R.E., arrived at Quebec from England, with instructions from Gen. Mann, inspector of fortifications, to superintend the building of the canal on the lines laid down by the Imperial commission. Foreseeing the possibilities of steam on the great river systems of Canada, and its importance on the canal as a motive power instead of horses, as contemplated by the

commission, he, on the 13th July, 1826, urged Gen. Mann to adapt the work to the use of steam power, including the enlargement of the locks to admit vessels of 130 feet in length. This was vigorously opposed by Sir J. C. Smyth, with the result that Col. By was directed to commence construction on the original lines.

About the middle of September, 1826, Col. By and his assistant, Lient. Pooley, reached Hull, and shortly afterwards inaugurated the work by laying out the entrance of the canal at "Sleigh Bay," its present location under the shadow of the eastern block of the parliamentary buildings. The importance of the occasion was signalized by the arrival, a few days afterwards, of the Governor, Earl Dalhousie, who formally approved of the location selected.

The first steps taken in actual construction consisted in the building of a bridge across the Ottawa River fronting the Chaudière Falls, on the site of the present iron bridge, in order to get in material and supplies, the erection of barracks for the men and magazines for stores, and the construction of a road from the Chaudière Falls to Long Island, on the Rideau River. These works were completed by the close of 1827, excepting the bridge, which was not opened until a year later. In the construction of these works we first meet with the names of the men who built the more important structures of the canal—the Hon. Thos. McKay of Bytown, John Redpath of Montreal, and Robert Drummond of Kingston.

In 1827 the chief contracts were given out—Mr. Pennyfather taking the excavation for the first eight locks at the Ottawa River end, Mr. McKay the construction of these eight locks, as well as those at Hartwell's and Hogsback, Mr. Redpath the great works at Jones Falls, Messrs. Fenelon & Henderson the earth excavation and grading from the entrance locks to Dow's Swamp and thence to Hogsback, whilst Mr. Robert Drummond had the Kingston Mills locks and the extensive dykes and dam near there.

On the 26th October, 1827, Col. By, with the experience

of more than a year to guide him, as well as a personal acquaintance with the details of the work, made up for the Ordnance Department in London his own estimate of the cost of the canal. It reached the sum of £463,899 stg. This vast increase over the estimate of the commission of 1826 created an intense stir in the department, and resulted in orders being sent out to Col. By for the immediate stoppage of all work wherever practicable, and in the appointment of a commission, composed of Sir Jas. Kempt, Col. Edw. Fanshaw and Col. Lewis, to investigate the character of the work and the cause of the extraordinary expenditure. This committee, on the 28th June, 1828, reported, on the whole very favorable to Col. By, and recommended the canal to have a depth of 5 feet at the lowest water and the locks to be of a size to admit a steamer 108 feet long and 30 feet wide. On this report the size of the locks was fixed at 134 feet by 33 feet, and the work pressed on with Col. By's accustomed vigor.

After much difficulty and repeated failures at the works at Hogsback and Dow's Swamp, near Bytown, and great loss of life at some points, particularly Kingston Mills, where about 500 laborers died from malaria, necessitating the raising of the dams in order to flood the extensive swamps of the Cataraqui River, the Canal was ready for opening in August, 1831. Another delay however took place. Mr. Merrick, of Merrickville, cut off the water at that point by a dam in order to make repairs to his mills. This act raised very serious legal questions which were not settled before the winter set in. In consequence, it was not until the 29th May, 1832, that the first steamboat the "*Pumper*" with Col. By and his family on board, passed through from Ottawa to Kingston, and the Canal was formally opened to traffic.

On the 8th January, 1831, in writing to Col. Glegg, for the information of the Commander of the Forces, Col. By mentions that his estimate of the cost of the work as presented to the Imperial Commission in June, 1828, was

£693,449 stg. All of the official papers connected with the Canal do not appear to have been printed as parliamentary returns, but the last estimate published brought up the cost to nearly £800,000 stg.

As the city of Ottawa owes its inception to the construction of the Rideau Canal, it is interesting here to note that the first settler at Hull was Philemon Wright, the founder of the Wright family there, who on the 3rd January, 1806, obtained a crown patent covering lot 2 in the 3rd range including the water privileges at the Chaudiere Falls on that side of the river. The original locatee of the corresponding lot and water privilege on the Ontario side was Robert Randall, whose rights were however in 1820, bought at sheriff's sale by Lieutenant Le Breton, from whom, and from the large exposed areas here of level, Trenton limestone, the locality acquired the name of "Le Breton Flats." In 1820, Earl Dalhousie bought for the government, the Fraser property, lying between the Starks and Besserer properties on the one side, and the Ottawa River on the other, and on instructions from him in the end of September, 1826, Col. By, laid out in town lots the upper part of this, and Dr. A. J. Christie became apparently, the first locatee of a lot upon the site. In 1827, the swamp then covering a considerable area east of the Canal entrance, was drained, divided into lots, and became known as Lower Town, to distinguish it from the part surveyed during the previous year which was called Upper Town. The name of Bytown—in honor of Col. By—was then given to the two settlements, which were separated not only by the Canal but also by what was known as Barrack Hill, now the site of the Parliament Buildings. The name Bytown, soon became thoroughly established. Reference is made to it in the Imperial Commissioner's report of the 28th June, 1828, and on the 18th July, 1829, a petition from "some of the inhabitants of Bytown" was forwarded to Sir James Kempt, complaining about the conditions on which town lots had been sold. Thus originated the present city of Ottawa.

